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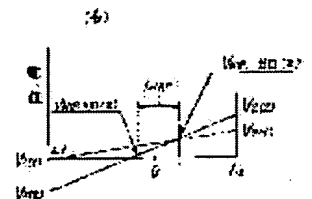
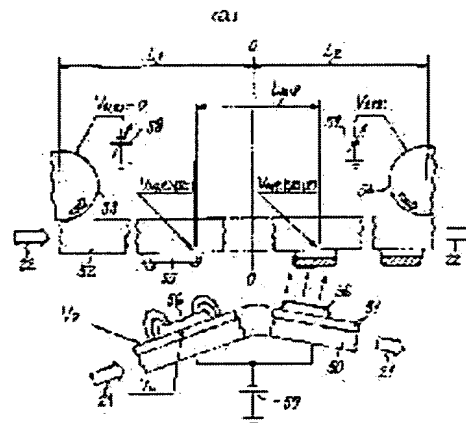
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(54) TRANSFER METHOD

(57)Abstract:

PURPOSE: To prevent transfer dust from shifting to a photoreceptor at the time of primary transfer, in a transfer method for successively forming a powder image having a different color on an image carrier and successively performing the overlap-transfer of the powder image on the photoreceptor (primary transfer).

CONSTITUTION: Among conductors for imparting a transfer bias at the time of primary transfer, a potential (V1) to be impressed on the conductor 53 positioned on an upstream side is made to have the same polarity as the electrostatically charged polarity (negative) of the charged powder body on the image carrier 51, and a potential (V2) to be impressed on the conductor 54 positioned on the downstream side is made to have a polarity (positive) different from the electrostatically charged polarity of the charged powder body, and the transfer is carried out in a state where the potential (V1) is shifted to the electrostatically charged polarity side of the charged powder body and the potential (V2) is shifted to the side opposite to the electrostatically charged polarity of the charged powder body largely and respectively every time the number of overlap-transfer times is increased.



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CLAIMS

[Claim(s)]

[Claim 1] The image acceptor which has the thickness it is thin from the image support which consists of a semi-conductor or an insulator, and the semi-conductor or insulator which opposite arrangement is carried out and runs to said image support and same direction so that it may approach or contact in said image support front face and a predetermined imprint nip field, It detaches L2. a/lower stream of a river when it can set from the middle point of said imprint nip field to said travelling direction -- respectively -- distance L1 -- As said image support of said image acceptor, the field which counters, and the field of the opposite side are touched, the conductor for imprint bias impression is arranged, respectively. In the imprint approach which puts the electrification fine particles which are put on said image support and move on said image acceptor front face, and imprints them over multiple times in said imprint nip field Said electrification fine particles on said image support are faced carrying out said imprint to said image acceptor. Potential (V1) impressed to the conductor located in the upstream among said conductors is made into the electrification polarity of the electrification fine particles on said image support, and the same polarity. Potential (V2) impressed to the conductor located in the downstream among said conductors is made into the electrification polarity of the electrification fine particles on said image support, and a different polarity. The imprint approach characterized by performing said imprint where said potential (V2) is shifted for said potential (V1) to the electrification polarity of said electrification fine particles, and the opposite side respectively more greatly at the electrification polarity side of said electrification fine particles whenever the count of an imprint in said heavy imprint increases.

[Claim 2] The imprint approach characterized by making the average volume resistivity of the thickness direction of an image acceptor into $10^8 - 10^{12}$ ohm-cm in claim 1.

[Claim 3] In claim 1 or claim 2, the die length of the part which said image support and said image acceptor counter in the distance below aerial discharge initiation distance in said imprint nip field Imprint nip length (LNIP), The potential in said imprint nip field by said conductor Nip field potential (VNIP), Potential of the entry of said imprint nip field is made into nip field entry potential (VNIP, inlet port), and they are $VNIP \text{ and inlet-port} = -(V2-V1)/(L1+L2) \times (LNIP/2) + VNIP$ (however, it considers as $VNIP = (V1 \text{ and } L2+V2, L1)/(L1+L2)$). ** -- the imprint approach characterized by imprinting imprint nip field potential (VNIP) controlling said potential (V1, V2) to approach the surface potential VTA of the fine particles imprinted on said image acceptor whenever the count of an imprint in said heavy imprint increases, when carrying out.

[Claim 4] Electrification fine particles are made to support on said image support with a development counter in claim 1 or claim 2. When considering as the configuration which imprints these electrification fine particles to said image acceptor, changing two or more preparations and each development counter one by one and making said development counter into said thing [piling up and imprinting], Between the time amount (B section) of the change initiation time from which said electrification fine-particles termination location on said image acceptor puts in the entry of said imprint nip field, and said development counter is changed from this time to the following development counter, The imprint approach characterized by making said potential (V1) and said potential (V2) into the polarity different from said electrification fine particles on said image

support.

[Claim 5] Electrification fine particles are made to support on said image support with a development counter in claim 1 or claim 2. When considering as the configuration which imprints these electrification fine particles to said image acceptor, changing two or more preparations and each development counter one by one and making said development counter into said thing [piling up and imprinting], The imprint approach characterized by making fixed time amount and said potential (V1, V2) into the electrification polarity of the electrification fine particles on said image support, and the same polarity from before at the change initiation time from which said development counter is changed to the following development counter.

[Claim 6] The imprint approach characterized by making said potential (V1) and said potential (V2) the same as the electrification polarity of said electrification fine particles on said image support, and making it larger than the time of a normal imprint at the time of imaging cancellation in claim 1 or claim 2.

[Claim 7] The imprint approach characterized by detecting the surface potential VTA of the fine particles imprinted on said image acceptor by the potential detection sensor in claim 5.

[Claim 8] The imprint approach that nip field entry potential (VNIP, ENT) which is the potential of the entry of said imprint nip field at the time of the first primary imprint is characterized by controlling said potential V1 and said potential V2 to approach the polarity side of the electrification fine particles on said image support from said potential VL in claim 1 when potential in the image section of said image support is set to VL.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the imprint approach.

[0002]

[Description of the Prior Art] The electro photographic printer of a middle imprint object method is known as what has advantages, such as output speed, the repeatability of a color, and the unquestioned nature of a form class, in one of the full color image formation equipment.

[0003] The image support which consists of a semi-conductor or an insulator by this middle imprint object method, A monolayer with the semi-conductor which opposite arrangement is carried out and runs to said image support and same direction so that it may approach or contact in said image support front face and a predetermined imprint nip field Or the image acceptor which consists of two-layer [which ****ed the semi-conductor inside and carried out the insulator outside], It considers as the configuration which has distance L1 and two conductors for imprint bias impression which separated L2 and have been arranged from the middle point of said imprint nip field on a/lower stream of a river when it can set to said travelling direction on said image acceptor. the electrification fine particles which are put on said image support and move -- said two conductors -- the imprint approach which puts on said image acceptor front face, and is imprinted over multiple times in the imprint nip field of a between is adopted.

[0004] As an example of the equipment which adopted this imprint approach, drawing 11 explains color picture formation equipment. In this drawing, on the occasion of image formation, the image support 51 which carried out the shape of a belt rotates to the clockwise sense, and is first charged in the predetermined surface potential VD with the electrification roller 4. As this image support, a semi-conductor or an insulator is used and, generally it is called a photo conductor.

[0005] Next, the height partial image slack electrostatic latent image of surface potential is made by the laser write-in system 5. Here, an exposure pattern is an image pattern corresponding to the predetermined color after separating the color of a desired full color image into four colors of yellow, a Magenta, cyanogen, and black.

[0006] One color of this electrostatic latent image is developed at a time by the rotation mold development counter construct 2 which has yellow, a Magenta, cyanogen, and the development counters 6, 7, 8, and 9 that hold each developer of black respectively by the non-contact developing-negatives method or the contact developing-negatives method, and it is development-ized.

[0007] Next, the image acceptor 52 contacts the image support 51, it rotates to the counterclockwise sense, and a development image is imprinted on this image acceptor 52. This is called a primary imprint or a middle imprint. By repeating the same process as this and repeating the imprint of multiple times for every color with black, cyanogen, a Magenta, and yellow in order of development, from a bottom, a toner image is accumulated on the order of yellow, a Magenta, cyanogen, and black by image acceptor 52 front face so that there may be no location gap. Here, although the image acceptor 52 is the so-called middle imprint belt and is made into monolayer structure with a semi-conductor in the example illustrated below, it can also be made into the two-layer structure which carried out the semi-conductor inside and carried out the insulator

outside.

[0008] Then, the imprint to paper is performed through the feed roller 18 and the resist roller 19 from the feed base 17. This imprint is called secondary imprint and the secondary imprint section is said for the part into which this imprint is performed. In the secondary imprint section, a secondary imprint is performed to the transfer paper conveyed to this section by the paper imprint roller 14. After this secondary imprint termination, it is fixed to a transfer paper by the anchorage device 20, and a full color image is outputted.

[0009] On the other hand, recovery cleaning of the non-imprinted toner which remained on the image support 51 is carried out by photo conductor cleaning equipment 15 for every color, and the potential unevenness of a latent image is further discharged with the electric discharge vessel 35. Moreover, after imprint ending to paper, recovery cleaning of the non-imprinted toner which remained on the image acceptor 52 is carried out by the image acceptor cleaning blade 16. Although this blade 16 contacts an image acceptor after the imprint to the paper of the above-mentioned 4 color toner is completed, it is estranged before that.

[0010] As shown in drawing 11 and drawing 12, the image acceptor 52 stretched by the interstitial segment of the image support 51 stretched between two rollers between other two rollers is constituted so that it may contact. The field containing this contact part and the contiguity part of both near [this] the contact part is called an imprint nip field. Or above-mentioned others and image support and an above-mentioned image acceptor also call this contiguity field where it may be constituted in so that it may approach, and an imprint is performed in this configuration an imprint nip field, without contacting physically. [configuration]

[0011] With this kind and image formation equipment, the problem on the quality called generating of image Chile is one of causes of profile dotage and a color blot. In case this Chile imprints the toner image from image support to a middle imprint object two or more times, since it becomes severe, it is called imprint Chile. The generating mechanism of this imprint Chile is explained.

[0012] [1st primary imprint] In drawing 12 (a) explaining the 1st primary imprint of the heavy imprints, the image support 51 and the image acceptor 52 are rotated so that it may go on to the same direction in an opposite contact part. For simplification, the above-mentioned opposite contact part is omitting illustration, and is illustrating it about the periphery of this contact part, and image support and an image acceptor move to the sense shown by arrow heads 21 and 22, respectively.

[0013] Moreover, about the image acceptor 52, when making the segment passing through the middle point of an imprint nip field into O-O, it is prepared in the/[top] lower stream of a river in the travelling direction so that it may rotate from this segment O-O, contacting possible [distance L1 and electric conduction of the conductors 53 and 54 which are the distant locations L2 and become the background of this image acceptor from a conductive roller].

[0014] Since the conductor 53 located in the downstream on the travelling direction of the image acceptor 52 is located in the entrance side of an imprint nip field, it is called an entrance-side conductor, and since the conductor 54 located in the upstream is located in the outlet side of an imprint nip field, it is called an outlet side conductor.

[0015] In drawing 12 (a), if the die length of the part which the image support 51 and the image acceptor 52 counter below in aerial discharge initiation distance in an imprint nip field is used as the imprint nip length LNIP, the core of this imprint nip length LNIP will agree with segment O-O. in addition, drawing 12 (a) and drawing 12 (a) shown below — in each considerable explanatory view, although touched in the mode indicated in practice to be the image support 51 and the image acceptor 52 to drawing 11 on the segment O-O section, in order to simplify an explanatory view, as an applicable part is fractured and both were estranged, it is illustrating.

[0016] As drawing 11 explained, the electrification powder bed 56 by the fine particles which consist of the so-called toner formed on the image support 51 by each development counter of the rotation mold development counter construct 2 should be newly imprinted on the image acceptor 52, and is shown as a thing with the (-) charge here. In addition, the electrification powder bed shown with the sign 55 on the image acceptor 52 is an electrification powder bed after the 1st imprint. Hereafter, the figure in subscript () shows the a number of time of a middle imprint.

[0017] That the imprint of the electrification powder bed 56 should be made easy, the entrance-side conductor 53 was installed, and the (+) polarity (polarity and antipole nature of electrification fine particles 56 on image support 51) side of the source 59 of good transformation piezo-electricity has flowed in the outlet side conductor 54, and the electric conduction base material 50 of the image support 51 has flowed through the power source 57 for a base potential setup.

[0018] When potential impressed to the conductor 53 located in the upstream here is made into potential V1 (1), it is $V1(1) = 0$, and if potential impressed to the conductor 54 located in the downstream by the source 59 of good transformation piezo-electricity is made into potential V2, the potential distribution by the image acceptor 52 will be controlled to be shown in drawing 12 (b). That is, in the both ends of the section of the imprint nip length LNIP, the potential VNIP. outlet (1) in an outlet side has a larger potential gradient than the potential VNIP. inlet port (1) in an entrance side, and is both (+) of the electrification polarity of the electrification powder bed 56, and antipole nature.

[0019] In drawing 12 (b), in the state of potentials V1 and V2, since the image acceptor 52 is not a conductor, in the imprint nip part which is the section when the conductor is in contact with the image acceptor 52, an electric potential gradient is made in an imprint entrance side and an imprint outlet side. This has produced the electric potential gradient also at the both ends of the imprint nip length LNIP according to the view of proportional distribution.

[0020] Set to drawing 12 (a), and if layer surface potential of the electrification powder bed 56 on VL ($= -200v$) and the image support 51 is set to VTS, the potential in the image [potential / of the non-image part of the image support 51] section after exposure of VD ($= -900v$) and the image support 51 As Sign A shows in the direction which continues holding fine particles on the front face of the electrification powder bed 56 with the relation between these potentials, line of electric force (it is being displayed that it connects towards (+) from (-)) is working.

[0021] However, by being influenced of the potential of the image acceptor 52, the moment the image support 51 went into the imprint nip field, the sense of the line of electric force A which was acting between the image support 51 and the electrification powder bed 56 will change rapidly so that it may tend toward the image acceptor 52 from the image support 51, as Sign B shows.

[0022] For this reason, the holding power over the image support 51 is lost, as the arrow head of a broken line shows, fine particles move, and the part of the edge of this powder bed is broken down into a longitudinal direction. That is, it is before transition, and an image begins to collapse, and these collapsed fine particles move, as the arrow head of a broken line shows, they adhere to the outside of the original toner image shown with a broken line on the image acceptor 52, and serve as the so-called imprint Chile. This imprint Chile is imprint Chile in monochrome, and is imprint Chile before real transition. In addition, Sign VTA shows the surface potential of the electrification powder bed on the image acceptor 52 by drawing 12 (a).

[0023] [2nd primary imprint] In drawing 13 (a) explaining the 2nd primary imprint of the heavy imprints, since the potential V2 (2) impressed to a conductor 54 is made to step up to the (+) side more, the potential in the time of the 1st middle imprint is overlapped, and as shown in drawing 13 (b), a potential VNIP. inlet port (2) goes up.

[0024] For this reason, the fine particles of the transferred powder bed 56 on the image support 51 Line of electric force is produced in the direction shown with Sign C with the layer surface potential VTA which the electrification powder bed 55 on the potential VNIP. inlet port (2) of the image acceptor 52 shifted to the (+) side rather than the time of the layer surface potential VTS of this transferred powder bed 56 and the 1st middle imprint and the image acceptor 52 has. as the arrow head of a broken line shows, the imprint direction can be bent, fine particles move, and a sign 60 shows -- as -- the 2nd primary imprint -- imprint Chile is produced even if it is.

[0025] [3rd primary imprint] In drawing 14 (a) explaining the 3rd primary imprint of the heavy imprints, since the potential V2 (3) impressed to a conductor 54 is made to step up to the (+) side more, the potential in the time of the 2nd middle imprint is overlapped, and as shown in drawing 14 (b), a potential VNIP. inlet port (3) goes up.

[0026] On the other hand, the thickness of the powder bed by the side of the image acceptor 52 is

increasing. Therefore, the surface potential VTA becomes large at the (-) side, and the potential difference with the natural complexion section of the image acceptor 52 is larger.

[0027] [4th primary imprint] In drawing 15 (a) explaining the 4th primary imprint of the heavy imprints, since the potential V2 (4) impressed to a conductor 54 is made to step up to the (+) side more, the potential in the time of the 3rd primary imprint is overlapped, and as shown in drawing 15 (b), a potential VNIP. inlet port (4) goes up.

[0028] On the other hand, the thickness of the powder bed by the side of the image acceptor 52 is increasing. Therefore, the surface potential VTA becomes large at the (-) side, and the potential difference with the natural complexion section of the image acceptor 52 is larger.

[0029] Therefore, the fine particles which should be transferred from the profile circumference of the electrification powder bed 56 are detoured by the direction of the natural complexion section which separated from the imprint direction from the powder bed 55 as the arrow head of a broken line shows. This serves as Chile 60 under transition, and when repeating the process which kneads two or more-fold primary imprint, imprint Chile becomes the severest by the last round, i.e., the last color.

[0030] With the image formation equipment which used the conventional contacted discharge method slack charger although this imprint Chile is prevented, after image support and an image acceptor fully contacted, the shield which covers the flow of a discharge gas at an imprint nip inlet port was set so that imprint electric field might be given. When still far, imprint electric field are not given, but if this cure is explained more concretely, in case a photo conductor top toner will newly be imprinted in piles on the existing toner of a middle imprint object, after approaching, a prevention technique is about the toner of an image profile causing an imprint location gap, and serving as imprint Chile by giving true imprint electric field.

[0031] On the other hand, bias is directly introduced into the middle imprint object itself recently, and development of the method with which the electric-field domain of operators is prepared only near the primary imprint section is progressing. About the former (technique of forming a shield), these techniques are called a contact section electric-field formation method, and are distinguished [latter / (technique of preparing the electric-field domain of operators only near the primary imprint section) / a long distance electric-field formation method and] from the method of electric-field formation, and especially the latter technique is now studied briskly, in order that the current which the conventional non-contact charger has may solve problems, such as size and ozone abundant generation.

[0032] The following technique can be raised as a technique related to the latter.

(a. Technique of a JP,2-183276,A indication) This makes it the contents to impress larger bias than bias at the time of a just before color imprint at the time of the imprint of the last color, and to continue impressing bias also between each middle imprint phase in a primary imprint. The same bias is impressed at the entrance of a primary imprint, and it is related with the reversion prevention of an imprinted toner for which middle imprint belt length is needed from a configuration peculiar to this machine shorter than photo conductor length the imprint defective pair policy by toner pile imprint, and the second half the first half.

[0033] (b. Technique of a JP,2-212870,A indication) This makes it the contents to impress an electric conduction roller configuration method, a layout (detail abbreviation), and the toner and reversed-polarity bias of the primary imprint section. The same bias is impressed at the entrance of a primary imprint, and it is related with the cure against the improvement in the rate of an imprint the cure against an imprint omission, and the second half in which it originates in the nonuniformity of the imprint nip pressure by mechanical vibration the first half.

[0034] (c. Technique of a JP,3-282491,A indication) This attaches two or more electric conduction rollers to a belt flesh side in the secondary imprint section upstream, and makes it the contents to make it choose and ground according to a belt rate. As a cure against paper imprint Chile, it is what changed the electric potential gradient, and it is a technique in the secondary imprint section, and this does not start the primary imprint which requires the imprint of multiple times.

[0035] (d. Technique of a JP,4-310979,A indication) When bias is made adjustable at the time of a primary imprint, it makes to control a system write-in [optical] into the contents. Imprint voltage

variation and the imprint engine-performance fluctuation by toner coating weight unevenness are amended, and the SUPPU rise approach is also described. This technique also starts a secondary imprint and the problem at the time of the primary imprint which requires the imprint of multiple times is not solved.

[0036] (e. Technique of a JP,4-318578,A indication) The volume resistivity of a middle imprint belt is set to 108-1012-ohmcm, and it makes to step up middle imprint bias for every color into the contents. Moreover, it makes to make secondary imprint electric field larger than primary imprint electric field into the contents. It is an image turbulence preventive measure the first half, and is for the rate improvement of an imprint the second half. This technique is premised on the case where the number of conductors is one, in the primary imprint section.

[0037] (f. JP,2-110586,A, technique of a USP No. 5,172,173 indication) It is the thing of the contents which specified the lamination and the volume resistivity of an imprint belt for imprinting only once, and makes into the contents to establish the electric potential gradient which has a peak in the downstream. It is a technique for image upgrading and there is no direct relation about bias modification for every color in the example of an imprint belt.

(g. Technique of a JP,2-50170,A indication) It is as follows when the description of the technique of this official report indication is listed.

** When quantity resistance belt material is used, in order to prevent carrying out the charge up, the resistance belt is used inside. Since resistance is not too low, prevent dielectric breakdown, and a charge is made to dissipate moderately from the charge up local from not being too high, and destruction or discharge are not made to perform by the belt of 107-1010-ohmcm.

** Apply clear transition electric field for back imprint (generally proved reverse transcription.) prevention. For this reason, imprint electric field are made to step up in the direction transferred further more from the direction to which a toner is transferred at first. It is last time at the imprint time, and the maintenance charge of a toner [finishing / an imprint] influences a middle imprint object at the imprint of the toner which should be imprinted shortly. Therefore, in a color pile, step-up of imprint electric field is needed. In an official report, (-) bias is applied in the semantics to pull to the toner charged in (+).

** The low resistance toner with few edge effects is used for the so-called prevention of the poor imprint in a boundary, the poor color reproduction by imprint Chile at the time of a color pile; and halo development. Since negatives are developed mostly near a boundary by the development edge effect and surplus charge electric field are formed, a gap (rotation is called.) of a direction comes by high resistance toner use to the imprint electric-field inclination of the boundary section, and stripping of the near [a boundary] toner under transition is carried out by it. With this technique, according to the description of the above-mentioned **, fundamentally, by the toner and reversed-polarity bias, it becomes the direction to transfer, this steps up, and the rate of an imprint of the direction of line of electric force improves. Moreover, prevention of imprint Chile generating by the color pile is aimed at according to the description of **. With this technique, polar bias which is different at an inlet port/outlet is impressed. Moreover, although reference is made about the potential difference, it is unstated about step-up to the direction which does not make a toner imprint. A reverse transcription phenomenon will be produced in relation with the description given [above-mentioned] in **.

** In respect of the handling of a reverse transcription phenomenon, by this invention, the reverse transcription of an entrance side becomes in the increasing direction apparently, and serves as a technique of this official report indication to hard flow logically. Furthermore, with the technique of this official report indication, the cure against imprint Chile is only using a low resistance toner. As mentioned above, if it restricts to imprint Chile by the toner conventionally, as a cure against color pile imprint Chile, it is inadequate. As other descriptions, about the field of belt resistance, since the electrical potential difference of the imprint nip section is determined by resistance ratio, a current is required, and discharge to a rear face is ensured from an electrode. The view of such a volume-resistivity field differs from the view of the resistance division in the invention in this application. In the illustrated example, the outlet side roller of the primary imprint section is float-ized. Moreover, from a surface to a inner layer, unless it is a monolayer, explanation is not

consistent. Furthermore, there is a publication about toner q/m , a low resistance toner, etc. (h. Technique of a JP,4-29174,A indication) The machine indicated by this official report is the example of the imprint belt of a monochrome machine, and is not the example of the color picture formation equipment using a middle imprint object. The purpose considers directly the discharge unevenness seen on a side front when paper exfoliates from a belt as a sink and the cure against discharge unevenness through the contacted electric discharge brush on a belt on a paper background at a recovery box or an imprint conveyance belt. The above technique is an example of reference and does not hit the cure technique over color pile Chile.

(i. Technique of a JP,4-319979,A indication) Although the machine indicated by this official report is image formation equipment which used the middle imprint object, it makes an image inverting function a problem. It is related with the approach of covering a middle imprint object with a toner, sucking up beforehand, to the photo conductor exposed except the need section, and making a reversal copy. Field reversing is impressed in case a toner is actually returned to a photo conductor. All over drawing, the inlet port and the outlet are made into the same bias in the primary imprint section. The above technique is an example of reference and does not hit the cure technique over color pile Chile.

(j. Technique of a JP,5-265335,A indication) The technique about the image formation equipment which used the middle imprint object for this official report is indicated. It has the primary imprint roller of Maine which determines the potential of imprint nip, and has Laura an inlet port and Deguchi further. The bias of Laura an inlet port and Deguchi is controlled, or is grounded by predetermined resistance, and has potential. The purpose is the rate rise of an imprint at the time of multiple color. The bias of an inlet port and an outlet is the same, and differs from this point and the invention in this application. Moreover, the purposes also differ.

[0038]

[Problem(s) to be Solved by the Invention] In said various kinds of conventional techniques, sufficient effectiveness cannot be acquired about generating of imprint Chile for a primary imprint. In case especially a color is piled up, when the existing toner charge [finishing / an imprint] remains, imprint Chile becomes intense more.

[0039] Therefore, the purpose of this invention is to offer the imprint approach that generating of imprint Chile for a primary imprint can be prevented.

[0040]

[Means for Solving the Problem] In order to attain said purpose, this invention was constituted as follows.

[0041] (1) A monolayer or a semi-conductor with the image support which consists of a . semi-conductor or an insulator, and the semi-conductor which opposite arrangement is carried out and runs to said image support and same direction so that it may approach or contact in said image support front face and a predetermined imprint nip field inside It detaches L2. a/lower stream of a river when an insulator can be set to said travelling direction from the image acceptor which consists of two-layer [which was *****ed outside], and the middle point of said imprint nip field -- respectively -- distance L1 -- As said image support of said image acceptor, the field which counters, and the field of the opposite side are touched, the conductor for imprint bias impression is arranged, respectively. In the imprint approach which puts the electrification fine particles which are put on said image support and move on said image acceptor front face, and imprints them over multiple times in said imprint nip field Said electrification fine particles on said image support are faced carrying out said imprint to said image acceptor. Potential (V1) impressed to the conductor located in the upstream among said conductors is made into the electrification polarity of the electrification fine particles on said image support, and the same polarity. Potential (V2) impressed to the conductor located in the downstream among said conductors is made into the electrification polarity of the electrification fine particles on said image support, and a different polarity. Whenever the count of an imprint in said heavy imprint increased, we decided to perform said imprint, where said potential (V2) is shifted for said potential (V1) to the electrification polarity of said electrification fine particles, and the opposite side respectively more greatly at the electrification polarity side of said electrification fine particles (claim 1).

[0042] (2) In . (1), the average volume resistivity of the thickness direction of an image acceptor was made into 108 - 1012 ohm-cm (claim 2).

[0043] (3) In . (1) or (2), the die length of the part which said image support and said image acceptor counter in the distance below aerial discharge initiation distance in said imprint nip field Imprint nip length (LNIP), The potential in said imprint nip field by said conductor Nip field potential (VNIP), Potential of the entry of said imprint nip field is made into nip field entry potential (VNIP, inlet port), and they are $VNIP \text{ and inlet-port} = -(V2-V1)/(L1+L2) \times (LNIP/2) + VNIP$ (however, it considers as $VNIP = (V1 \text{ and } L2+V2, L1)/(L1+L2)$). ** -- when carrying out, whenever the count of an imprint in said heavy imprint increased, we decided to imprint imprint nip field potential (VNIP) controlling said potential (V1, V2) to approach the surface potential VTA of the fine particles imprinted on said image acceptor (claim 3).

[0044] (4) Electrification fine particles are made to support on said image support with a development counter in . (1) or (2). When considering as the configuration which imprints these electrification fine particles to said image acceptor, changing two or more preparations and each development counter one by one and making said development counter into said thing [piling up and imprinting], Between the time amount (B section) of the change initiation time from which said electrification fine-particles termination location on said image acceptor puts in the entry of said imprint nip field, and said development counter is changed from this time to the following development counter, We decided to make said potential (V1) and said potential (V2) into the polarity different from said electrification fine particles on said image support (claim 4).

[0045] (5) Electrification fine particles are made to support on said image support with a development counter in . (1) or (2). When considering as the configuration which imprints these electrification fine particles to said image acceptor, changing two or more preparations and each development counter one by one and making said development counter into said thing [piling up and imprinting], We decided to make fixed time amount and said potential (V1, V2) into the electrification polarity of the electrification fine particles on said image support, and the same polarity from before at the change initiation time from which said development counter is changed to the following development counter (claim 5).

[0046] (6) In . (1) or (2), we decided to make said potential (V1) and said potential (V2) the same as the electrification polarity of said electrification fine particles on said image support, and to make it larger than the time of a normal imprint at the time of imaging cancellation (claim 6).

[0047] (7) In . (5), it was presupposed that the surface potential VTA of the fine particles imprinted on said image acceptor is detected by the potential detection sensor (claim 7).

[0048] (8) In . (1), when potential in the image section of said image support was set to VL, the nip field entry potential (VNIP, inlet port) which is the potential of the entry of said imprint nip field at the time of the first primary imprint decided to control said potential V1 and said potential V2 to approach the polarity side of the electrification fine particles on said image support from said potential VL (claim 8).

[0049]

[Function] By shifting the bias by the conductor in an imprint nip entrance side according to the count of an imprint, the line of electric force itself which influences transition by said entrance side is weakened, transition of the electrification powder itself is controlled and Chile at the time of transition is lessened. On the other hand, said shift is interlocked with and bias is shifted to the conductor of an imprint nip outlet side so that strong electric field may be given. ** and the rate of an imprint as the whole can prevent generating of imprint Chile to this, without falling.

[0050]

[Example]

(1) The important section of the equipment configuration suitable for carrying out this invention is shown in the explanatory view 1 corresponding to . claim 1 (a). the same sign as the sign shown in drawing 15 from said drawing 11 used for explanation of the conventional technique in drawing explained by each operation of this example and the following -- with -- **** -- the shown member presupposes that it is common with the member shown in drawing 15 from said drawing 11.

[0051] In addition, as shown not only in this but in drawing 5, the conductor of the shape of a wedge of an obtuse angle can be used, or although said example explained conductors 53 and 54 as a roller-like thing, respectively, a blade-like conductor can also be used for them as shown in drawing 6.

[0052] In drawing 1 (a), a different point from the former is making the conductor 53 of an entrance side flow through the (-) polarity (polarity [of the electrification fine particles 56 on the image support 51], and same polarity) side of the source 59 of good transformation piezo-electricity.

[0053] As opposed to the conductor 54 located in the downstream in this example as shown in drawing 1 (a) as usual the count of a middle imprint -- responding -- the (+) polarity side -- V2 (1) -- < -- V2 (2) -- < -- V2 (3) -- < -- the conductor 53 which sets to V2 (4) and is located in the upstream -- receiving -- the (-) polarity side -- V1 (1) -- < -- V1 (2) -- < -- V1 (3) -- < -- the sources 58 and 59 of good transformation piezo-electricity are sequentially controlled so that it may be set to V1 (4).

[0054] Although it is the same as that of the mode of drawing 12 in the conventional technique which already explained the 1st primary imprint and being considered as the proper value of 0, potential V2 (1), and a potential V1(1) = (+) polarity About the 2nd primary imprint or subsequent ones, whenever potential the inlet port of V [61m in the entrance side of the image acceptor 52 piles up the count of a primary imprint, it is controlled to shift to the electrification polarity (-) side. [of the electrification powder bed 56] Drawing 2 (a), (b), and the 4th primary imprint are shown [imprint / 2nd / primary] in drawing 3 (a) and (b) about drawing 1 (a), (b), and the 3rd primary imprint, respectively.

[0055] Consequently, direction change of line of electric force of electrification fine particles own [on the image support 51] decreases, and, for this reason, it is hard coming to generate imprint Chile (imprint Chile before a real imprint) where the electrification fine particles produced in order that the direction of line of electric force might change rapidly conventionally shift to a longitudinal direction.

[0056] Moreover, in order that the potential VL in the image section on potential the inlet port of V [61m (2), and image support may approach in potential also about imprint Chile under transition (*1), the line of electric force itself which influences transition by the entrance side becomes weak. Therefore, since transition of the electrification fine particles itself decreases, Chile at the time of transition by the entrance side is avoidable.

[0057] In addition, since the rate of an imprint as the whole falls, in order to prevent this the way things stand, it is made for potential to be built by the (+) polarity side among nip fields in the way near an outlet. If it does in this way, since Chile of fine particles decreased in the entrance side and strong electric field are given in the outlet side, the rate of an imprint as the whole is maintained without falling.

[0058] This example performs many middle (primary) imprints by the contact section electric-field formation method in addition to the middle imprint method of a full color printer, and has the same advantage which prevents imprint Chile in all the image formation equipments that accumulate fine particles.

[0059] The image support which consists of the semi-conductor or insulator which puts electrification fine particles on a front face in this example, and moves by it, The image acceptor which consists of the semi-conductor or insulator which contiguity alienation is carried out [insulator] with said image support front face, and has electrification fine particles imprinted over multiple times, To said image acceptor rear face, on the/[top] lower stream of a river in the migration direction, from the opposite section Distance L1 and two conductors left L2, The same polar potential V1 as the electrification polarity of the fine particles on image support is given to an upstream conductor. The potential V2 the electrification polar of said fine particles and polar [different] is given to a downstream conductor. By adopting the method which shifts potential V1 to the electrification polarity side of said fine particles more, shifts potential V2 to the electrification polarity of said fine particles, and the opposite side more according to the count of an imprint, and shifts potential V2 to the electrification polarity of said fine particles, and the

opposite side more Chile of a fine-particles image and the so-called imprint Chile can be decreased effectively.

[0060] (2) The example of an explanation book corresponding to . claim 2 makes reference about the volume resistivity of an image acceptor in the image formation equipment which adopts a middle imprint method. In the contents explained based on said drawing 1 , it is the point that having pinpointed 108 – 1012 ohm-cm and the range differs the average volume resistivity of the thickness direction of the image acceptor 52 from said example.

[0061] Drawing 1 was indicated that easy resistance division produces the middle imprint section potential of the image acceptor 52 with spacing with the conductors 53 and 54 of both ends. However, in practice, when a metal roller is used as conductors 53 and 54 which touch the image acceptor 51, according to surface roughness, a crater, etc. of an image acceptor, junction is trustworthy and is not acquired.

[0062] In air, since dielectric breakdown happens about a minute gap, it is possible to lessen the potential difference. However, generally advance of dielectric breakdown of air changes with the volume resistivities by the side of charge maintenance a lot. In this case, it is required for one of a charge supporter and the acceptors to be 108 – 1012 ohm-cm about an average volume resistivity.

[0063] Since dielectric breakdown does not advance rapidly, discharge can be made to continue constantly in this volume resistivity. When discharge is stabilized constantly and performed, charge conferment continued from the conductor 2 to the image acceptor background to the conductor 1 is performed from an image acceptor background, an electric potential gradient as shown in drawing 1 (b) will arise constantly, and a middle imprint will be performed good.

[0064] In addition, when the volume resistivity of an image acceptor is too high, a charge remains, potential (charge up) distribution becomes out of balance, potential unevenness arises on both image acceptor table reverse side, and the electric potential gradient in the imprint nip section will become unstable.

[0065] On the other hand, if a volume resistivity is too low, dielectric breakdown cannot be stopped on a part, but the part from which the discharge current becomes rapid occurs, and for this reason, too unstable potential unevenness will be made to an image acceptor, and it will become harmful to a primary imprint.

[0066] The image support which puts a fine-particles image and moves by the above, and the average volume resistivity of the thickness direction are made into 108 – 1012 ohm-cm. Said image support and multiple times, and contiguity and the image acceptor by which estranges and two or more rotation copy is carried out in this fine-particles image, To said image acceptor rear face, on the/[top] lower stream of a river in the migration direction, from the opposite section Distance L1 and two conductors left L2, Give the same polar potential V1 as the electrification polarity of fine particles to an upstream conductor, and the potential V2 the electrification polar of fine particles and polar [different] is given to a downstream conductor. Since it has the power source which shifts potential V1 the electrification polarity side of fine particles more, and shifts potential V2 to the electrification polarity of fine particles, and the opposite side more according to the count of an imprint, in the primary imprint covering the multiple times of a charged fine-particles image, imprint Chile can be reduced effectively.

[0067] (3) The example of an explanation book corresponding to . claim 3 is related with the bias control approach that imprint Chile for a primary imprint can be most effectively generated for prevention. As stated above (*1), imprint Chile of a potential inlet port [the inlet port of V [61m] before an imprint decreases [the direction put close to the potential VL or its circumference potential, for example, the potential VD, i.e., natural complexion potential, of the non-image section of image support, of image support of the electrification powder bed lower part]. This is for leaving the holding power on image support by the entrance side. The following formula is needed although applied for control of these.

[0068] First, in distance L1 and L2 and potentials V1 and V2, potential the inlet port of V [61m is defined. As for the imprint nip field potential VNIP, distance L1 and L2 is expressed simple as follows, when large enough compared with potential the inlet port of V [61m.

[0069]

$$VNIP=(V1 \text{ and } L2+V2, L1)/(L1+L2)$$

It continues, and considering the potential of the nip inlet-port section, it can approximate according to the inclination of the potential within the imprint nip length LNIP with V [61m inlet-port $=-(V2-V1)/(L1+L2) \times (LNIP/2)+VNIP$. It sets to this potential inlet port of V [61m, and the surface potential VTS of the non-imprinted electrification fine particles beforehand measured with the electrometer etc., and is $V[61m \text{ inlet-port} \Rightarrow VTS$. -- (1)

It carries out. Here, it means controlling \Rightarrow to bring a left-hand side value close to a right-hand side value. It is the same as below. Moreover, it is $VTA+V[61m \text{ inlet-port} \Rightarrow VL$ beforehand between VTA(s) (in this case, since the potential of an image acceptor is set to 0, potential is measurable only by the powder bed) measured as $V1=V2=0$ in addition to the time of an imprint. -- (2)

It is made to become. Here, a powder bed follows potential VTA on becoming thick for every count of an imprint, and needs to remeasure it. (1) A formula has the effectiveness which reduces imprint Chile before transition, and, on the other hand, (2) types have the effectiveness which reduces imprint Chile under transition. About the cure against imprint Chile of a full color printer, control as shown by (2) formulas according to the count of a primary imprint is effective. In addition, by the upper formula, although potential V1 and potential V2 become settled uniquely, since the contribution to the rate of an imprint is high, potential V2 cannot usually be made small. Therefore, in this case, after an experiment determines potential V2, it is good to determine potential V1 by the upper formula.

[0070] Although the above is the case of the 1st primary imprint, when the powder bed on an image acceptor becomes twice as many thickness as this, potential will usually be near on the front face twice. Therefore, since the fine-particles surface potential VTA on an image acceptor (2) serves as with a potential [1st / VTA] (1) ****, if potentials V1 and V2 are controlled to bring a potential $V[61m \text{ inlet port}$ close to potential VL in this way, the bias range in the cure against imprint Chile can be effectively determined without an experiment.

[0071] In the 2nd imprint, when potential distribution of an image acceptor front face is controlled to be shown in drawing 4 (a), it becomes like drawing 4 (b) and drawing 4 (c), respectively, transition of fine particles begins from the inlet port of the field of the imprint nip length LNIP, and transition ends the fine-particles potential distribution on an image acceptor, and the fine-particles potential distribution on an image acceptor at the field outlet of the imprint nip length LNIP. In addition, a drawing destructive line shows the surface potential of fine particles. The sign which surrounded (-) by the round mark expresses the fine particles of the (-) polarity in ****.

[0072] Since it imprints controlling said potentials V1 and V2 by the above by this example to approach the surface potential VTA of the fine particles by which the imprint nip field potential VNIP was imprinted on said image acceptor whenever the count of an imprint in a heavy imprint increases, it can ask for the bias range which can reduce imprint Chile easily.

[0073] (4) The explanation corresponding to each claim below the explanation corresponding to claim 4 is related with the timing of control of potentials V1 and V2. Drawing 7 explains the general hardware used for this control. In drawing 7, the control drive of the source 58 of good transformation piezo-electricity, the source 59 of good transformation piezo-electricity, the motor 63 for rotation of the rotation mold development counter construct 2, and the development counter bias power supply 64 is carried out by the central-process section 61 through the I/O section 62, respectively. Moreover, an image acceptor is approached, the sensor for detection for surface potential measurement of a powder bed is formed in the location X ahead of [that] an imprint field, and the output of this detection sensor is inputted into the I/O section 62.

[0074] The timing chart of control by this hardware is shown in drawing 8. In this drawing 8, each sign means the following contents.

[0075] T1 ; Rotation termination T2 of a development counter construct (completion of operation to the contact condition of a development counter) ; Rotation initiation (escape actuation initiation from contact condition of development counter) T3 of a development counter configuration party ; Bias impression ON T four to a development counter ; The bias impression OFF T5 to a

development counter ; Initiation of the image beginning of a development counter (It corresponds to a form top image starting position) T6 ; Termination DT of the image beginning of a development counter (it corresponds to the image termination location on a form) ; From a development location (location where a development counter and image support have countered) to the first imprint location (location where image support and an image acceptor have touched) The time amount which image support requires for moving, i.e., time lag, (= distance / rate)

A section is the section of a primary imprint in drawing 8 , in this section, according to explanation of said example, it is controlled by the (-) polarity about potential V1, and an image acceptor is controlled by the (+) polarity about potential V2, respectively.

[0076] By the actual machine, what displayed as the fine particles of the (+) polarity by the fine particles which are not normal polarities, i.e., this example, on image support after termination of this A section, and was displayed as "reverse electrification fine particles" here is scattered in many cases. These fine particles are generated by charge conferment by friction of the electrification fine particles itself, even when a development counter is normal.

[0077] Although these "reverse electrification fine particles" has few amounts of fine particles, since it generates continuously besides the real image section, it cannot ignore by relation with the recovery capacity of image acceptance side cleaning equipment.

[0078] Then, when there is no image, potential V1 and potential V2 are made into the (+) polarity the original polarity of fine particles, and here between the time amount (B section) of the change initiation time from which the electrification fine-particles termination location on an image acceptor specifically puts in location opening of an imprint nip field, and a development counter changes from this time to the following development counter, and this stops "reverse electrification fine particles" on image support. Or it is made to return on image support. By doing in this way, the recovery capacity of the cleaning stripping section in the direction of an image acceptor is reducible. Therefore, the capacity of a cleaning stripping section can be reduced and it can miniaturize.

[0079] In using the image acceptor of the shape of a belt rotated to an one direction shown in drawing 7 , even if it is the fine-particles image of small size which is imprinted to small size paper in a secondary imprint, it is necessary to rotate this belt by one rotation after the imprint of the Isshiki eye.

[0080] Although there is no actual image in A section in this case, reverse electrification fine particles will turn to the primary imprint section with a development property. So, as shown in Table 1, in order not to make these fine particles imprint, the potentials V1 and V2 by the sources 58 and 59 of good transformation piezo-electricity are controlled.

[0081]

[Table 1]

状 態	V ₁	V ₂	図の対応区間
画像時	(-)	(+)	図 8 の A 区間
非画像部	(+)	(+)	図 8 の B 区間
切替時	(-)	(-)	図 8 の C 区間
緊急停止	(--)	(--)	図 10 に示す

(注) : 表中、(--) は通常より高い (-) 極性バイアスを示す

[0082] Thus, although the sources 58 and 59 of good transformation piezo-electricity are made strange possible [an output] by the controller of central-process section 61 grade, it is also controllable using the interlocking relay switch 80 to replace with this approach and to be shown in drawing 9 .

[0083] linkage -- a relay switch -- 80 -- potential -- V -- two -- giving -- a sake -- a power source -- from -- having extended -- a terminal -- a -- b -- c -- and -- potential -- V -- one -- giving -- a sake -- a power source -- from -- having extended -- a terminal -- a'b'c -- ' -- a terminal -- a -- a -- ' -- a terminal -- b -- b -- ' -- a terminal -- c -- c -- ' -- combination -- sliding -- making -- switching . The electrical potential difference is set to each [these] terminal

so that the suitable bias of said explained contents may be beforehand impressed according to the combination of each terminal.

[0084] As mentioned above, at the time of un-forming an image, the recovery capacity to the fine-particles cleaning equipment by the side of a non-acceptor can be reduced by making potentials V1 and V2 into the polarity different from electrification fine particles.

[0085] (5) The example of an explanation book corresponding to . claim 5 applies the example of the above (1) and (2). When a non-image part is in a development region, he rotates a rotation mold development construct and is trying to change development counters 6-9 on image support in an example of a machine which was raised to drawing 11 at the time of full color. In this development means, since it is the electrostatic capacity which a current circuit is mutually formed and both sides cannot ignore when a development counter newly contacts image support, fine particles may adhere to the location which is not meant. Moreover, unnecessary fine particles adhere to a non-image region similarly by mechanical vibration, and it becomes the cause which disturbs an original image.

[0086] The fine particles of an electrification polarity of normal are the cause which disturbs this image, and it is the fine particles shown "They are fine particles (normal) at the time of a change" in drawing 8 , in this example, is charged in the (-) polarity and has occurred in C section. So, in this example, it prevents that impress the bias of the (+) polarity during C section, these fine particles are primarily imprinted contrary to having impressed in said B section, and turbulence of an image arises on an image acceptor.

[0087] In this example, bias potentials V1 and V2 of a fixed time amount and image acceptor are made into the original polarity of fine particles, and the same polarity (here (-) polarity) from before at the change initiation time from which a development counter changes to the following development counter, and this returns the above-mentioned fine particles on image support (refer to [said / Table 1]).

[0088] It becomes possible to mitigate and carry out small [of the recovery capacity of the cleaning stripping section in the direction of an image acceptor] by doing in this way. Even if it faces activation of this example, the interlocking relay switch 80 shown in drawing 9 can be used.

[0089] In the image formation equipment of the above (2) which has a change-type development counter above, the recovery capacity to the cleaning equipment of image acceptor side fine particles can be reduced after development counter change timing by making fixed time amount and potentials V1 and V2 the same with the electrification polarity of fine particles.

[0090] (6) In an example of a machine which was raised to the explanatory view 11 corresponding to . claim 6, if it will collect, for example by failure in paper feed etc. using the cleaning recovery system of an image acceptor after imprinting the image of the image support on an image acceptor, when sudden stop instruction comes at the time of the image formation by laser light, a cleaning recovery burden cannot but increase too.

[0091] At for this reason, the time of latent-image formation of a up to [the image support by the laser write-in system] (at this time, in the primary imprint section) the already visualized existing fine-particles image imprints primarily -- having -- while, when stop instruction comes It sets in the primary imprint section also in image formation in the write-in process section of image support. The bias potentials V1 and V2 of a primary imprint are changed to the original polarity of fine particles, and the same polarity (here (-) polarity) like the example of the above (5). Suppose that it returns and detains to an image support side, without transferring the fine particles of a normal electrification polarity which constitute said existing fine-particles image after the time of stop instruction being emitted to an image acceptor.

[0092] Potentials V1 and V2 at this time are made larger than the time of a normal imprint, and raise return effectiveness. In drawing 10 , a sign (STOP) shows the timing out of which the stop instruction of imaging came to the laser write-in system. here -- said -- as carried out, already pass a development process, since the fine particles which constitute the existing image of the time of the existing fine-particles image by fine particles having ridden on image support, and the stop instruction of imaging being emitted are already transferred on an image acceptor though the fine particles are unavoidable, let bias potentials V1 and V2 be larger (-) potentials than the bias at

the time of the usual primary imprint so that the stop instruction of imaging may not make it transfer to an image acceptor side about the fine particles of the image part after a generating **** time.

[0093] Thus, in the image formation equipment of the above (2), the recovery capacity to the fine-particles cleaning equipment by the side of an image acceptor can be reduced by changing potentials V1 and V2 to a larger value than before similarly to the electrification polarity of fine particles at the time of an imaging halt.

[0094] (7) It is the example of the explanation above (2) corresponding to . claim 7, and (5), and the surface potential VTA of the existing electrification powder bed on an image acceptor is important for determining many constants for bias control. However, the property of the following [the electrification fine particles itself and a development condition] is usually changed as follows.

[0095] Q/M ; amount M/A of charges per unit volume ; The fine-particles mass deposition condition per unit area; originally, whenever the compensation, the condition of condensation and rarefaction, therefore the surface potential VTA </SUB> of bulk density impress the potentials V1 and V2 for bias, it is desirable to impress, after detecting the fluctuation condition relatively and amending it. Then, the sensor for surface potential detection of fine particles is installed in the location of Sign X shown in drawing 7 .

[0096] By this sensor, the surface potential VTA of the existing powder bed which moves to the primary imprint section is detected. Of course, although ***** [detected fine particles] on an image, they are good to develop the mark for detection each time and to detect this from the ease of using, at the horizontal edge (location on a direction perpendicular to space in drawing 7) of an image acceptor, for example. This detection result is used for the operation which it was incorporated by the central processing unit 61 and explained in the example of the above (2).

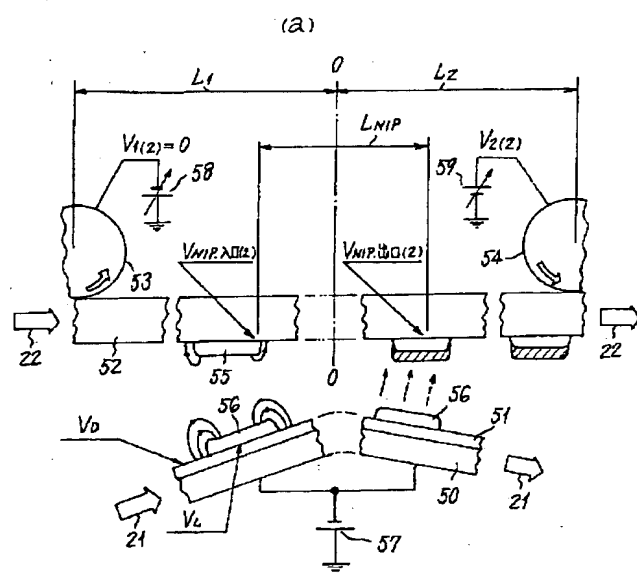
[0097] In this example, fine control is attained rather than it can set the fine-particles surface potential VTA to imprint Chile prevention by detecting by the potential detection sensor serially.

[0098] (8) By the primary imprint of the 1st explanation corresponding to . claim 8, since there is no toner in a televising side, in the form where imprint Chile is shown in drawing 13 , the imprint toner itself may bring about Chile without occurring. Therefore, in order to lose imprint Chile, it is desirable to control said potentials V1 and V2 so that nip field inlet-port potential VNIP.ENT may approach the electrification fine-particles polarity side on image support from the potential VL in the image section on image support from the start. At drawing 1 (b), it becomes possible by giving potential V1 greatly to the (-) polarity side further. This is the same also in a monochromatic primary imprint.

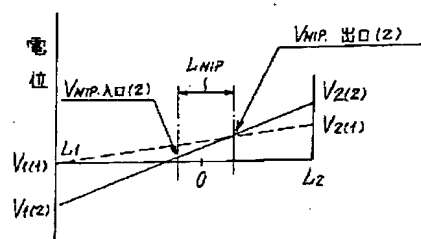
[0099] By this example, when image section potential of image support is set to VL in the primary imprint method of the example of the above (1), the Isshiki eye imprint can also lose imprint Chile effectively by controlling potentials V1 and V2 for the imprint field inlet-port potential V[61m inlet port at the time of the first primary imprint from said potential VL to an electrification fine-particles side. In each example stated by explanation corresponding to each claim explained above, although it was about the thing of monolayer structure with a semi-conductor as an image acceptor 52 The operation effectiveness equivalent to the case in monolayer structure can be acquired about generating prevention of imprint Chile for [when the image acceptor of the two-layer structure which *****ed the semi-conductor inside and carried out the insulator outside is used] a primary imprint in addition to this. Here, with a semi-conductor, the inside resistor of 108-1012-ohmcm is included, and the high resistor more than 1013-ohmcm is included with an insulator. [0100]

[Effect of the Invention] By this invention, generating of imprint Chile for a primary imprint can be prevented.

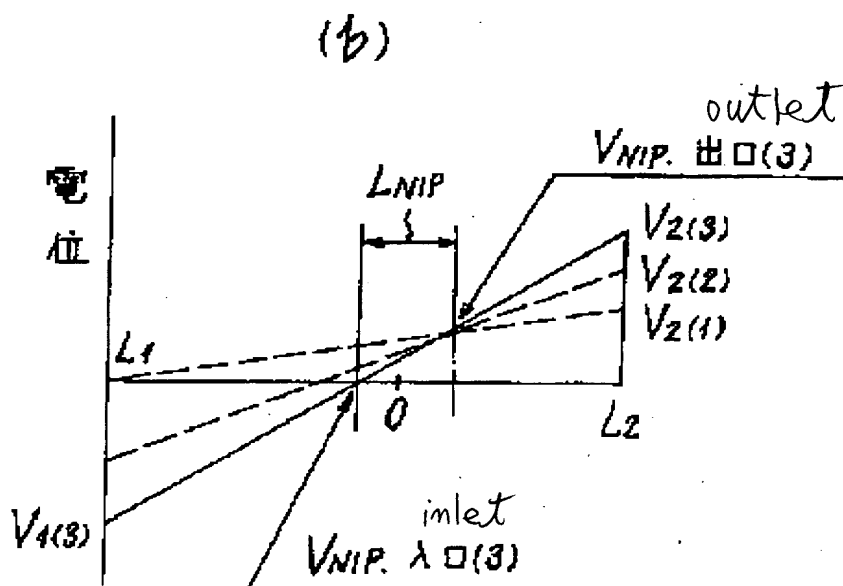
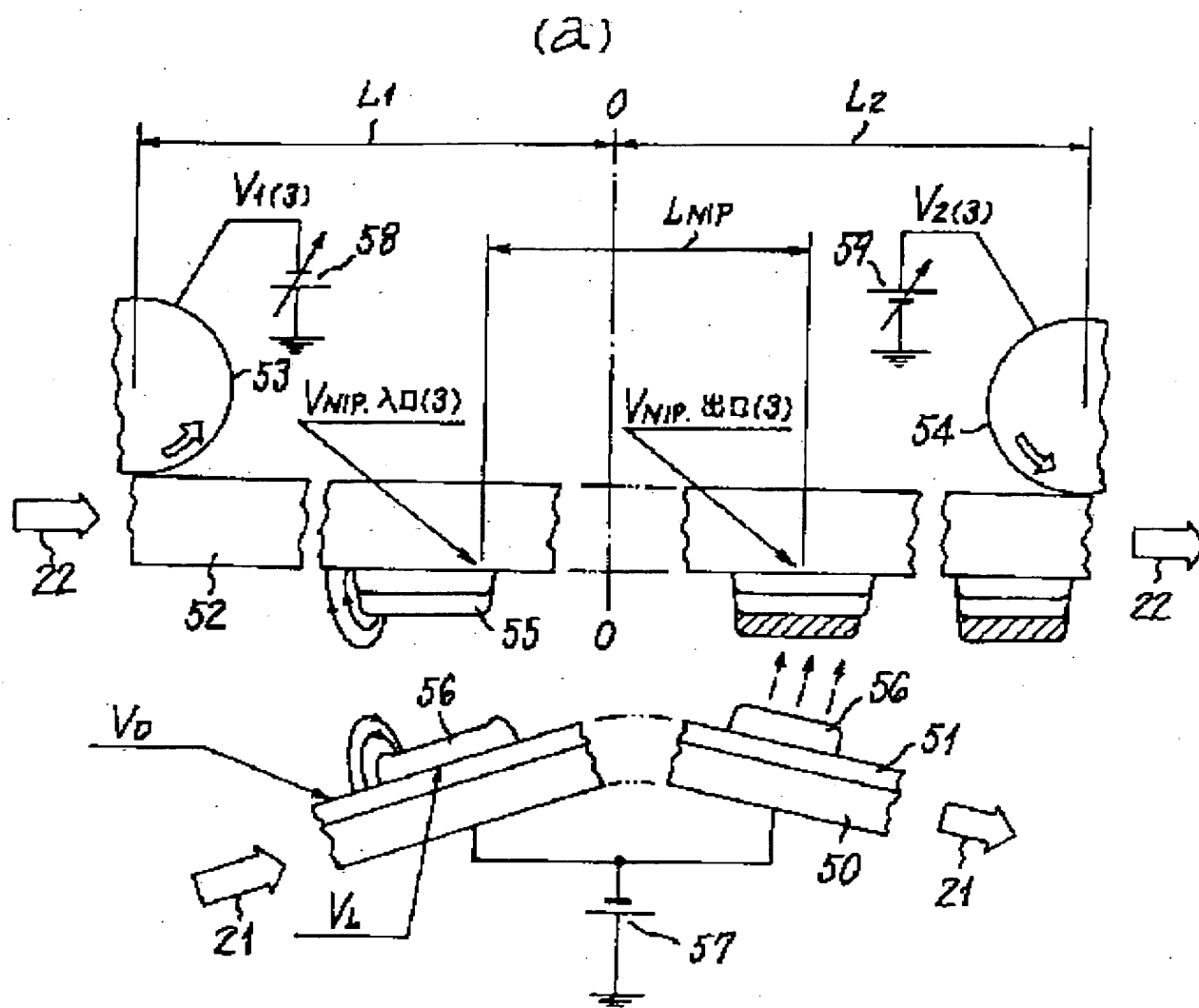
[Translation done.]

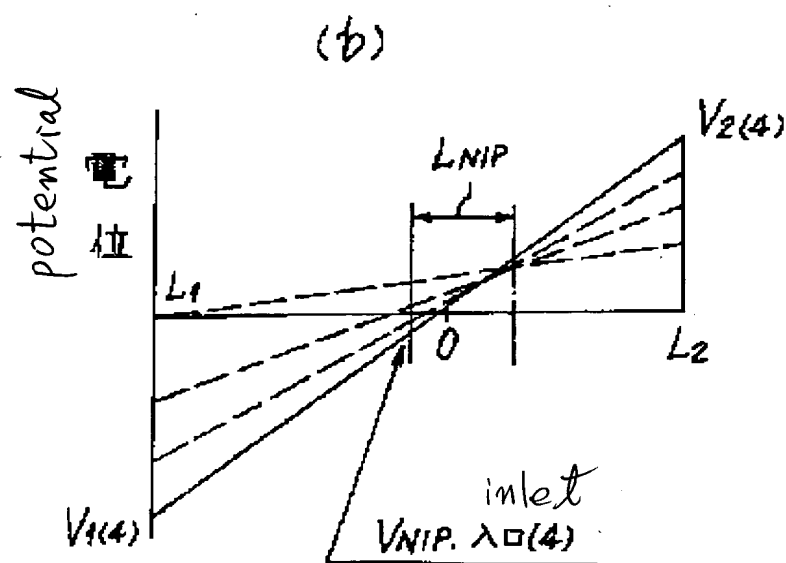
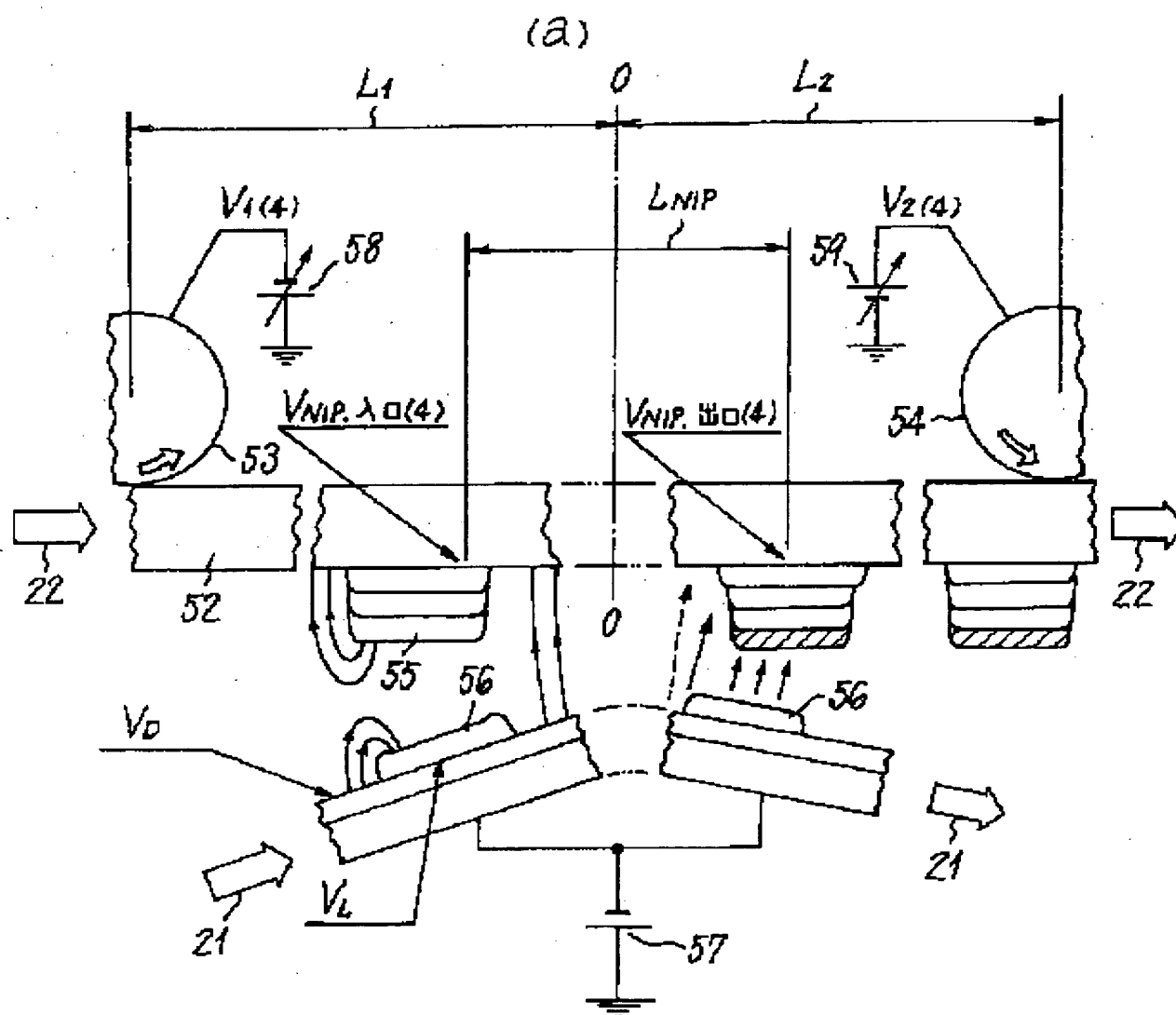
Drawing selection drawing 1

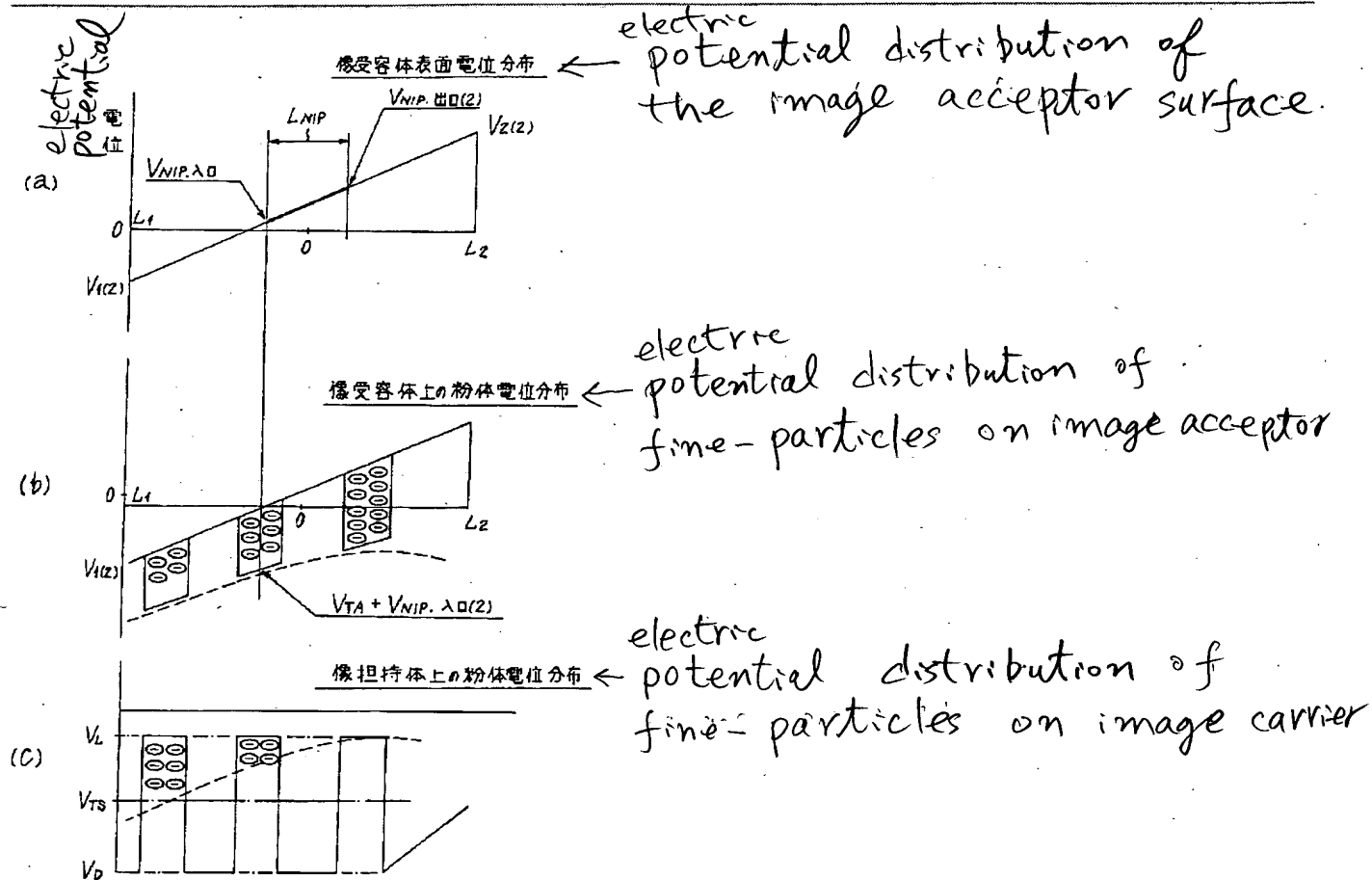
(b)



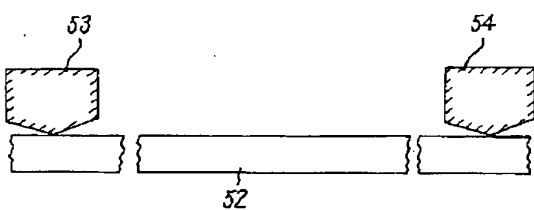
[Translation done.]



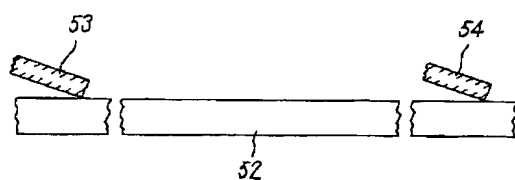


Drawing selection drawing 4

[Translation done.]

Drawing selection 

[Translation done.]

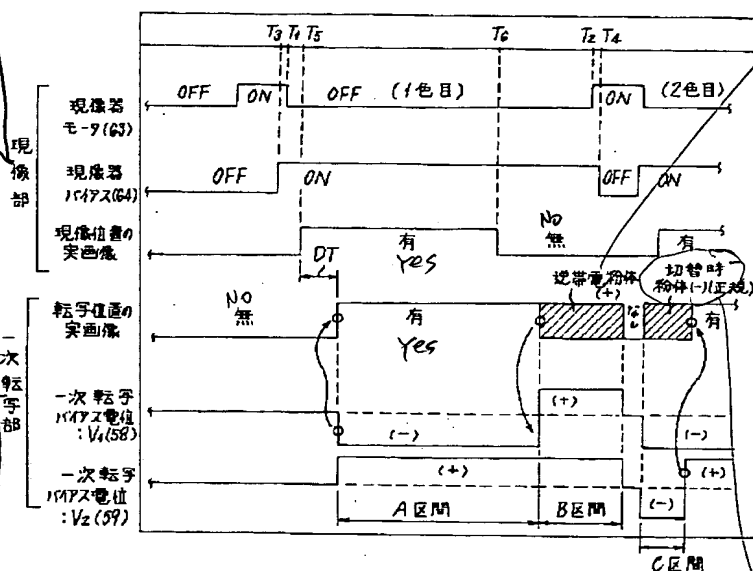
Drawing selection 

[Translation done.]

Drawing selection drawing 8

developing section

primary transfer section



positively charged fine-particles

← motor of the developer

← brush of the developer

← real image at the developer

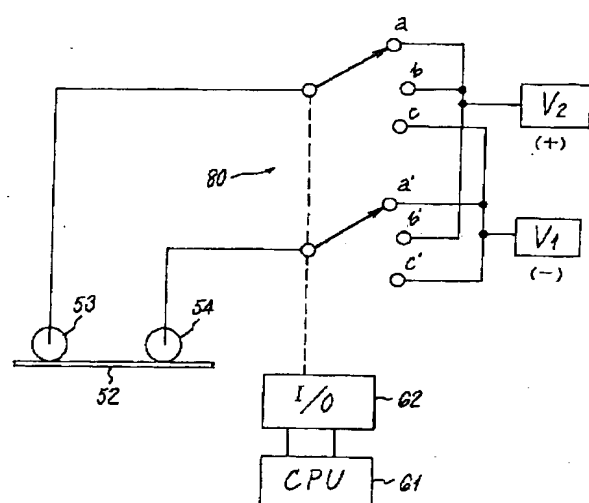
← real image at the transfer position

← primary transfer brush potential

← "

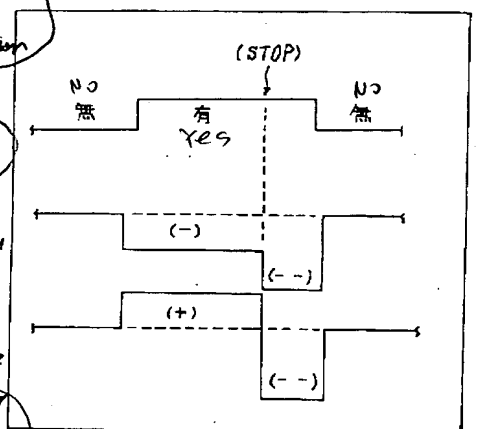
in switching negatively charged (Normal)

[Translation done.]

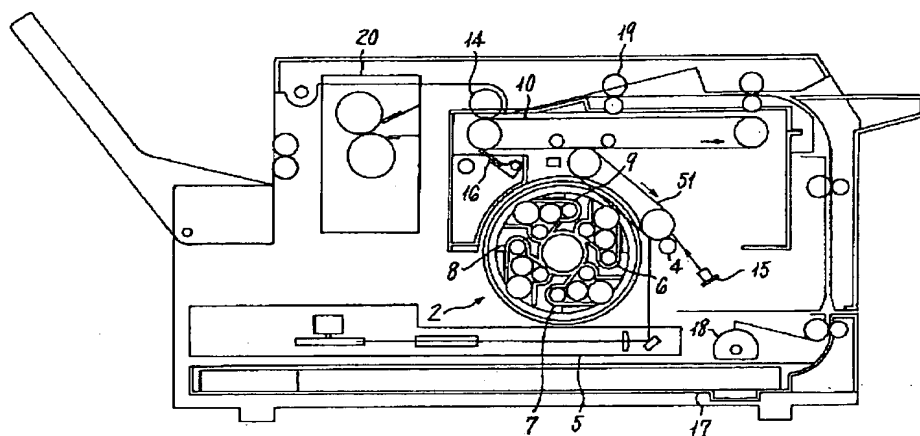
Drawing selection drawing 9

[Translation done.]

Drawing selection drawing 10

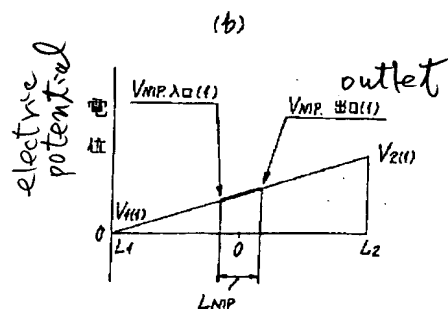
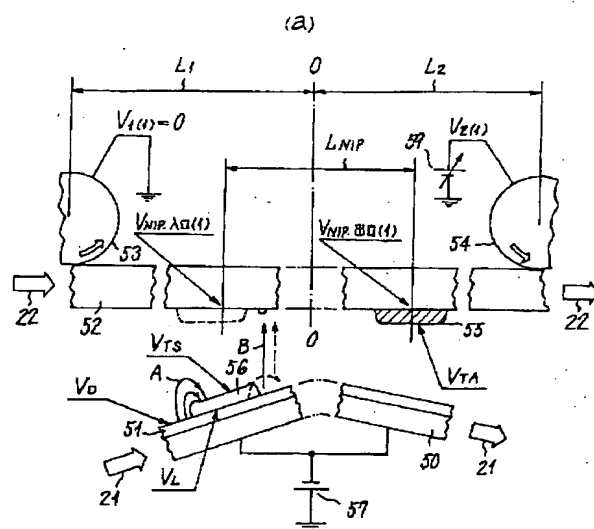
real image at
the transfer position転写位置の
実画像primary transfer
bias potential一次転写
バイアス電圧: V_1 二次転写
バイアス電圧: V_2 primary transfer
bias potential→ 時間
time

[Translation done.]

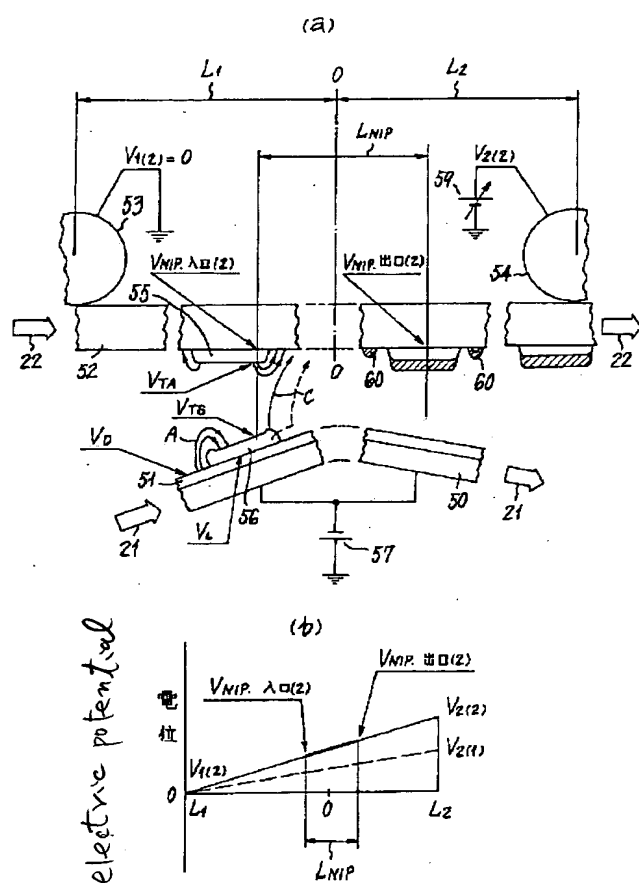
Drawing selection 

[Translation done.]

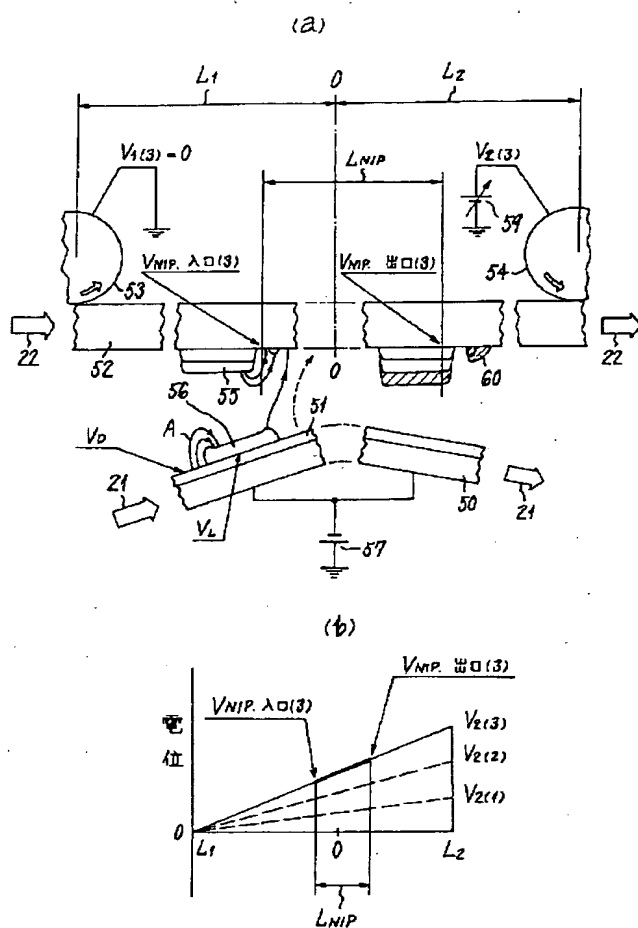
Drawing selection drawing 12



[Translation done.]

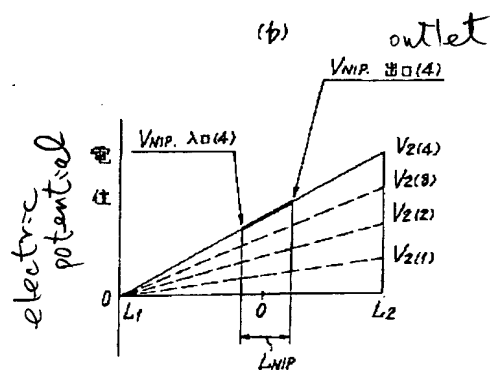
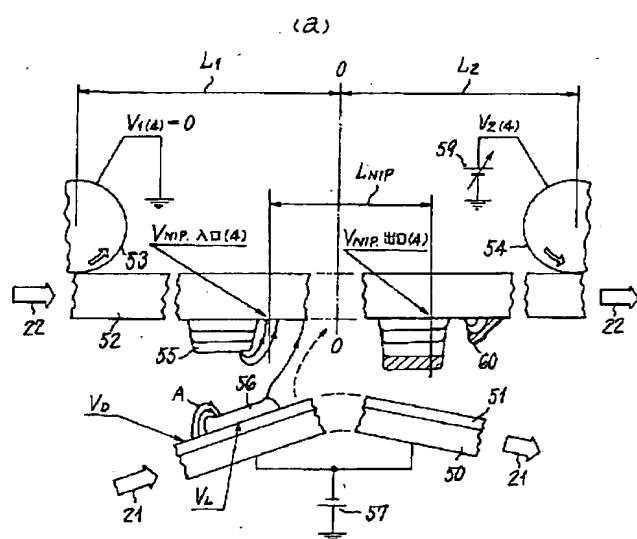
Drawing selection drawing 13

[Translation done.]

Drawing selection drawing 14.

[Translation done.]

Drawing selection drawing 15



[Translation done.]